

blamed, especially because he had omitted, for good reasons, to add carbolic acid to the prophylactic. Great alarm was produced. The idea that the poisoning was due, not to local accident, but to carelessness at the laboratory, caused, I have been told, a sudden and wholesale rejection of the invaluable vaccine by the people, with the probable result that thousands of lives may have been lost from plague.

Now it appears that the tetanus bacillus could not have entered the bottle at the laboratory at all! I agree with Prof. Simpson (*British Medical Journal*, February 9) in thinking that the arguments on this point are extremely strong. Had the contents of the bottle been polluted at the outset, they would have had a very offensive smell when used some time later, and would have produced a very rapid infection in the inoculated. As a matter of fact they had no smell, and produced a slow infection, while bottles filled simultaneously were quite sound. Moreover, evidence has been given tending to show that the prophylactic was polluted during the opening of the bottle. On what grounds, then, were the laboratory and its director indicted? Even if the bacillus had entered during the complicated process of manufacture, the blame can hardly be attached to the director, who cannot himself superintend the preparation of each bottle. As for the omission of the carbolic acid, the inventor of the prophylactic was himself surely the best judge of how it was to be made.

The serious part of the affair seems to lie, not so much in the loss of life due to the accident itself, considerable as that was, but in the much greater loss which probably followed the suspicion thrown upon the prophylactic by the apparently erroneous judgment of the commission, and, more even than this, in a certain ingratitude shown in India to a man who is one of the very greatest benefactors it has ever had. Haffkine not only elaborated the method of immunisation by dead culture, but, where many a man of science would have contented himself with merely writing an article on the subject, he addressed himself, on the contrary, to the much more difficult practical verification. I well remember when he arrived in India with his anti-cholera vaccine and by his energy and perseverance gradually forced his ideas upon the people and the Government. When the frightful calamity of the plague overtook the country in 1896, largely, in my opinion, owing to the inadequacy of the sanitary organisation and to want of firmness and resolution in the authorities, when measure after measure failed and the people were dying by hundreds of thousands, then Haffkine was the only one who made any successful stand at all against the storm. Quickly inventing his anti-plague prophylactic and forcing the authorities along with him, though he could not control the disaster, he at least checked it by saving thousands, if not hundreds of thousands, of human beings, who now owe their lives solely to him. The fact that more than six million doses of the prophylactic have been issued in India alone attests the success and magnitude of his work. Yet he has received for it less than nothing. For services which compared with his 'are really of a trifling nature, all kinds of officials receive in many cases pensions, promotion, and decorations. As for him, not only has he received no adequate recognition for his immense service, but he has been blamed for an accident which could not have been due to his fault, and it is doubtful whether he will ever return to a country which has treated him—I can only say—so ungratefully. Contemplating this history, we cannot help being filled with indignation at it. India seems to be becoming quite notorious for its treatment of scientific workers, suggesting ignorance both of science and of the importance of science. I remember the persecution suffered by Colonel King as the result of his work on vaccination, the complete want of gratitude shown to Mr. Hankin for his great work on the prevention of cholera, and several similar cases. While all kinds of people climb easily into the seats of honour, it seems that the men of real merit are fortunate if only they can escape without censure.

I think I shall be excused for writing somewhat strongly on a subject on which I have long felt still more strongly, and on which I have reason to know many others feel as strongly as myself without being as free as I am to express

their opinions. It appears to me a foolish thing for a nation to treat great men as we have sometimes treated ours, and the case of Mr. Haffkine—to whom, as he is a foreigner, we are doubly bound to show national gratitude—seems to be a glaring example of such treatment. I hope that steps will be taken to press upon the India Office the need for a reconsideration of the affair; the reputation of the whole country is concerned in it.

March 19.

RONALD ROSS.

Mean or Median.

THE article by Mr. Francis Galton in your issue of March 7, entitled "Vox Populi," is exceedingly interesting, and the variations in the estimates of individual competitors afford an admirable instance of the advantage to be derived from the use of the weighbridge at live-stock markets in preference to buyers and sellers relying on their own judgments; but the letter raises several interesting points as to the theoretical treatment of statistical data, to two of which I should like to allude.

In the first place, as to bias. No doubt, in estimating carcass weights in such a competition as that referred to by Mr. Galton, each competitor judges as truly as he can. But has a butcher (buyer) had his judgment to any extent warped in the course of years through having constantly had to judge of the weight of a beast (when buying) so as to be on the safe side, and secure himself from loss in the event of its not cutting up so well as he anticipated? If so, it might be expected that buyers would have an instinctive tendency to under-estimate the weights of animals; and similarly farmers (sellers) might be expected to over-estimate. This tendency, on either side, should, of course, not be large, as constant intercourse between buyers and sellers has raised such transactions almost to the point of a fine art. I should therefore like to ask Mr. Galton whether he has any information showing the proportion of these 787 competitors who were farmers and butchers respectively. It is very interesting to observe, from the figures given, that the estimated weights at each decile are throughout the whole series invariably below the weights which might be anticipated from the normal law of error. This rather looks as if buyers were in a majority in this competition: a not impossible suggestion, since, although farmers doubtless attend such exhibitions in larger numbers than butchers, yet the latter would, in a weight-judging competition, probably be more numerous than the former, at least relatively, if not actually.

The second, and more important, point to which I desire to direct attention is the use of the median in this connection, and I could wish that Mr. Galton had also calculated the arithmetic mean of the 787 observations. I should, in fact, like to strike a note of hesitation in regard to the too general use of the median in preference to the mean. The former has several advantages, one of which is that it is a form of "average" which can be very readily calculated. It is also very useful in cases such as those referred to in Mr. Galton's letter in *NATURE* of the preceding week, where it is desirable to eliminate one or two "cranks" whose opinion might have undue weight among a relatively small number of other opinions—in cases, in fact, where the distribution of opinions is known to be very erratic. But is this the case here? I am not sure that Mr. Galton is quite right in regarding the present instance as a case of "vox populi" at all. It is to be remembered that the great bulk of the trade in English cattle—and consequently the determination of the price of our native beef—is the result of transactions such as the competition in question is intended to test. Cattle are practically sold by inspection, and the judgment of buyer and seller as to how much beef there is in a given ox is really much more a matter of skill than of popular judgment; their livelihood depends upon the accuracy of such judgments. In such circumstances, is the median a nearer approximation to the truth than the mean? Here the question could be answered by calculating the arithmetic mean. I have not the actual figures, but judging from the data in Mr. Galton's article, the mean would seem to be approximately 1196 lb., which is much closer to the ascertained weight (1198 lb.) than the median (1207 lb.).

I should accordingly like to ask Mr. Galton whether he would indicate what, in his opinion, are the chief considerations to be taken into account in giving preference to the mean or the median as the better measure of the "average"? It is a point upon which there is considerable difference of opinion; the recognition of the median is rapidly extending, and some statisticians incline to think that there is a growing tendency to quote it in cases where the ordinary arithmetic mean is preferable.

March 16.

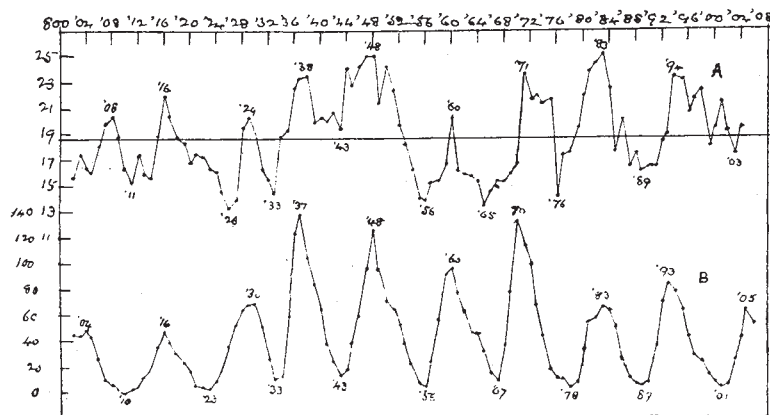
R. H. HOOKER.

Rothsay Rainfall and the Sun-spot Cycle.

THE rainfall of Scotland has been thought to show, in its variations, an influence of the sun-spot cycle of eleven years (in the sense of most rain about maxima). Evidence of this was furnished not long ago by one of our ablest meteorologists, Dr. Buchan, in a paper to the Scottish Meteorological Society (Journal, 3 ser., Nos. xviii.-xix., p. 117).

For such an inquiry the record of Rothsay, in Bute, is singularly valuable, extending back as it does to the year 1800 in unbroken series.

The relation to the sun-spot cycle may be traced, I think, not only in the total annual rainfall of Rothsay, but also, with more or less distinctness, in the amounts for certain sections of the year, and even individual months.



A, Rainfall July, Rothsay, 1800-1906; smoothed with sums of five; B, sun-spot curve.

Thus it is met with in the rainfall of summer, and especially that of July.

I have prepared a curve of the July rainfall (A), in which, by a familiar method, each year-point represents the rainfall of five contiguous Julys (i.e. 1800-4, 1801-5, and so on). Below is the sun-spot curve (B). The amount of correspondence between these two seems remarkable, and not easily explained by fortuitous coincidence.

ALEX. B. MACDOWALL.

The Relationship between Diamonds and Garnets.

IN an able paper entitled "The Diamond Pipes and Fissures of South Africa," read before the Geological Society of South Africa rather more than a year ago, Mr. H. S. Harger refers more than once to the significance of the fact that diamonds have been found embedded in garnets. Perhaps the fact that the converse is also true, namely, that the garnet sometimes occurs embedded in the diamond, may not be without its share of interest. I have here at the present time a fragment of a Wesselton diamond, weighing a little more than a carat, containing a small, irregular garnet of about one-tenth of a carat. Originally the fragment seems to have formed a part of a shapeless diamond of perhaps two carats, which evidently enclosed either two or three small garnets, or garnets and diamonds.

J. R. SUTTON.

Kimberley, South Africa, February 20.

THE WEATHER REPORTS OF THE METEOROLOGICAL OFFICE.

THE commencement of the new year was marked by the introduction of a number of changes in the weather reports of the Meteorological Office.

Two notable events have contributed to bring about modifications in the daily report. Arrangements have been made for regular telegraphic reports from Iceland, and for occasional reports by wireless telegraphy from the ships of the Navy.

Thanks to the Danish Government and the Great Northern Telegraph Company, the cable to Faeroe and Iceland, long desired by meteorologists and fishery associations, was laid in the summer of last year. There is a touch of sadness in the reflection that Adam Paulsen, director of the Danish Institute, who led the way so assiduously towards this meteorological Canaan, only got a distant view of the promised land. In August, 1906, he issued a circular on behalf of the Danish Government, defining the terms of subscription for the service of meteorological telegrams from Iceland, but, as already reported in NATURE, he died before the arrangements were completed.

Reports from Thorshavn in Faeroe and from Seydisfjord, on the east coast of Iceland, have been received in London, in a provisional way, since the end of October, but the meteorological telegrams from Reykjavik, on the west coast, commenced on Friday, February 15, as part of the full system which includes messages from Blönduós and Akureyri, where the land line touches the northern fjords, and Grimstadir, between the last-named place and Seydisfjord, where the cable lands. The meteorological arrangements are not complete even yet, for the reports do not conform to the established international model, either in uniformity of the hour of observation or the extent of the information transmitted; but those who have seen what the new information means for the weather map of north-western Europe, what light it throws upon the meteorological situation of the northern Atlantic, will appreciate the satisfaction that is felt with the result of the negotiations even in their present stage. Paulsen has indeed carved for himself a memorial *aere perennius* upon the winds and weather of the stormy northern island.

It is to the Lords of H.M. Treasury that we owe the realisation of this long-cherished project so far as this country is concerned. It need hardly be said that the cost of the new service is very considerable. Their lordships have undertaken to ask Parliament to increase the grant for meteorology from 15,300l., the figure at which it has stood since 1882-3, by 200l., and the greater part of our share of the expenses for Iceland telegrams is thus provided for.

In order that the new information may be incorporated in the daily weather report the area of the charts has been extended to a more western longitude than hitherto, and the occasion has been utilised also to take in an area as far south as Gibraltar, and to meet a wish, often expressed, that a barometric chart of the 6 p.m. observations of the previous evening should be given. This appears as an inset chart on the same scale as "yesterday's" 8 a.m. chart for the whole of Europe, side by side with the 8 a.m. chart for "to-day." But six o'clock observations